

# MAGNITUDE 7 METALS LLC

## Summary Report for ERT

METHOD 14 LINE 2

Run Number 1

10/6/2021

EPA Method # 5 & 14

AVG. ALUMINUM PRODUCTION RATE	8.64	TON/HR./LINE
PROCESS DATA CORRECTION FACTOR FOR ROOF EMISSIONS FROM PART (LB/HR)	0.002428	FACTOR
PROCESS DATA CORRECTION FACTOR FOR ROOF EMISSIONS FROM FLUORIDE (LB/HR)	0.002428	FACTOR
% ISOKINETIC (MANIFOLD to ROOF)	102.8	%
% ISOKINETIC (MANIFOLD to ROOF) CORRECTION FACTOR		

TOTAL PARTICULATE COLLECTED	49.2	MG
PARTICULATE CORRECTED FOR %ISOKINETIC > 120		
SECONDARY PARTICULATE CONCENTRATION	8.64E-04	GRAINS/DSCF
SECONDARY PARTICULATE EMISSION DUCT RATE	1.03E-02	LBS./HR.
SECONDARY PARTICULATE EMISSION DUCT RATE	1.19E-03	LBS./TON
SECONDARY PARTICULATE EMISSION	36.73	LBS./HR.
SECONDARY PARTICULATE EMISSION	4.25	LBS./TON
SECONDARY PARTICULATE EMISSION USING CORRECTION FACTOR	4.25	LBS./TON
PRIMARY PARTICULATE EMITTED	1.45	LBS./TON
PRIMARY AND SECONDARY PARTICULATE EMITTED	5.70	LBS./TON

TOTAL FLUORIDE COLLECTED	18.02	MG
FLUORIDE CORRECTED FOR %ISOKINETIC > 120		
SECONDARY FLUORIDE CONCENTRATION	3.17E-04	GRAINS/SCF
SECONDARY FLUORIDE EMISSION DUCT RATE	3.78E-03	LBS./HR.
SECONDARY FLUORIDE EMISSION DUCT RATE	4.38E-04	LBS./TON
SECONDARY FLUORIDE EMISSION	13.453	LBS./HR.
SECONDARY FLUORIDE EMISSION	1.557	LBS./TON
SECONDARY TOTAL FLUORIDE EMISSION USING CORRECTION FACTOR	1.557	LBS./TON
TOTAL PRIMARY FLUORIDE EMITTED	0.218	LBS./TON
TOTAL PRIMARY AND SECONDARY FLUORIDE EMITTED	1.775	LBS./TON

MAGNITUDE 7 METALS LLC  
METHOD 14 SAMPLE RESULTS

LINE 2

Run Number 1                                      10/6/2021 - 10/7/2021                                      EPA Method # 5 & 14

METER VOLUME	884.835	CU. FT.
SQUARE ROOT OF DELTA P	0.346	SQ. ROOT IN. WATER
AVERAGE DELTA H	1.450	IN. WATER
METERED GAS TEMPERATURE	69.0	DEG. F
STATIC PRESSURE IN STACK	-0.65	IN. WATER
STACK TEMPERATURE	97.1	DEG. F
BAROMETRIC PRESSURE	29.76	IN. Hg
PROBE TIP DIAMETER	0.3272	INCHES
GAS METER CORRECTION FACTOR	0.996	
TOTAL SAMPLING TIME	1395.0	MINUTES
TOTAL WATER COLLECTED	348.7	GRAMS
MOLECULAR WEIGHT	28.8	LB/LB-MOLE
SAMPLING DUCT AREA	1.25	SQ. FT.
TOTAL PARTICULATE COLLECTED	49.2	MG
GASEOUS FLUORIDE COLLECTED	10.92	MG
PARTICULATE FLUORIDE COLLECTED	7.10	MG
TOTAL FLUORIDE COLLECTED	18.02	MG
AVG ALUMINUM PRODUCTION RATE	414656	LBS./DAY/LINE
MANIFOLD ANEMOMETER VELOCITY	107.1	FT./MIN.
MANIFOLD THERMOCOUPLE TEMPERATURE	116.4	DEG. F
AVERAGE ROOF EXIT VELOCITY	86.2	FT./MIN.
AVERAGE ROOF EXIT TEMPERATURE	112.7	DEG. F
VOLUMETRIC FLOWRATE OUT ROOF	5505422	ACFM/LINE
VOLUME GAS SAMPLED	878.605	SCF
MOISTURE IN STACK GAS	1.834	%
VELOCITY OF STACK GAS (ACTUAL)	1206	FT./MIN.
VOLUMETRIC FLOWRATE IN DUCT	1393	SCFM
PERCENT ISOKINETIC - TRAIN TO DUCT	96.75	%
VOLUMETRIC FLOWRATE OUT ROOF	4958831	SCFM/LINE
PERCENT ISOKINETIC - MANIFOLD TO ROOF	102.84	%
SECONDARY PARTICULATE CONCENTRATION	8.64E-04	GRAINS/SCF
SECONDARY PARTICULATE EMISSION DUCT RATE	1.03E-02	LBS./HR.
SECONDARY PARTICULATE EMISSION DUCT RATE	1.19E-03	LBS./TON
ROOF-SECONDARY PARTICULATE EMISSION	36.73	LBS./HR.
ROOF-SECONDARY PARTICULATE EMISSION	4.25	LBS./TON
PRIMARY PARTICULATE EMISSION	1.45	LBS./TON
PRIMARY AND SECONDARY PARTICULATE EMISSION	5.70	LBS./TON
SECONDARY FLUORIDE CONCENTRATION	3.17E-04	GRAINS/SCF
SECONDARY FLUORIDE EMISSION DUCT RATE	3.78E-03	LBS./HR.
SECONDARY FLUORIDE EMISSION DUCT RATE	4.38E-04	LBS./TON
ROOF-SECONDARY FLUORIDE EMISSION	13.453	LBS./HR./LINE
AVG. ALUMINUM PRODUCTION RATE	8.64	TON/HR./LINE
PROCESS DATA CORRECTION FACTOR	0.002428	
ROOF-SECONDARY FLUORIDE EMISSION	1.557	LBS./TON
PRIMARY FLUORIDE EMISSION	0.218	LBS./TON
TOTAL PRIMARY AND SECONDARY FLUORIDE EMITTED	1.775	LBS./TON

**Stack Sample Results**  
**Raw Data Averages**

Printed  
10/7/2021 08:56 AM

METHOD 14      LINE 2

**Start Date:** 10/6/2021    **Stop Date:** 10/7/2021      **Run #: 1**

Traverse Point	Delta P (in. Water)	Delta H (in. Water)	Meter Temperature		Static Pressure (in. Water)	Stack Temperature (Deg. F)
			(in)	(out)		
1-1a	0.12	1.45	68	68	-0.64	93
1-1b	0.10	1.20	69	66		96
1-2a	0.15	1.80	67	66	-0.66	100
1-2b	0.15	1.80	68	67		104
1-3a	0.11	1.30	68	68	-0.65	111
1-3b	0.11	1.30	68	68		111
2-1a	0.11	1.35	69	67	-0.66	81
2-1b	0.11	1.40	69	67		76
2-2a	0.13	1.55	69	66	-0.64	107
2-2b	0.13	1.55	69	66		107
2-3a	0.13	1.55	75	69	-0.65	102
2-3b	0.13	1.55	71	70		101
3-1a	0.09	1.10	71	70	-0.61	89
3-1b	0.09	1.15	71	71		72
3-2a	0.13	1.60	72	71	-0.68	98
3-2b	0.12	1.45	71	71		101
3-3a	0.12	1.45	69	69	-0.70	100
3-3b	0.13	1.55	70	71		99
<b>Averages</b>	<b>0.346</b> (AVG. SQ. RT.)	<b>1.450</b>	<b>69.0</b>		<b>-0.65</b>	<b>97.1</b>

## MAGNITUDE 7 METALS LLC

METHOD 14 DATA

Digital meter used 2076Run Start Date 10/6/21Run End Date 10/7/21Line: 1 2 3 East 3 WestRun # 1

ROOF MONITOR

Run Start Time 09:05Initial L.C. @ 15.0 = .004Run End Time 08:20Final L.C. @ 5.0 = .002Probe Tip SN 3248Avg. Tip Diameter .3272Delta H 1.91 2% Moisture

Duct Area = 1.25 sq.ft. (assumed)

Initial Pitot L.C. = N/LFinal Pitot L.C. = N/L

Operators

Joe Schneider  
Chad Conway

POINT #	SAMP. TIME Min.	METER VOLUME Cu. Ft.	DELTA P in. H <sub>2</sub> O	DELTA H in. H <sub>2</sub> O	METER TEMP F IN	METER TEMP F OUT	STATIC PRESS. in. H <sub>2</sub> O	STACK TEMP. °F	IMP. TEMP. °F	HOT BOX TEMP. °F	PUMP VAC. in. Hg	SET PT.
1-1	155	597.000	-.12	1.45	68	68	-.64	93	60	150	1.2	12.14
			.10	1.20	69	66		96	58	155	1.0	12.08
1-2	155	676.300	.15	1.80	67	66	-.66	100	58	155	1.2	11.95
			.15	1.80	68	67		104	59	155	1.2	11.89
1-3	155	771.63	.11	1.30	68	68	-.65	111	59	155	1.0	11.75
			.11	1.30	68	68		111	60	135	1.0	11.75
2-1	155	867.000	.11	1.35	69	67	-.66	81	60	135	1.0	12.40
			.11	1.40	69	67		76	60	135	1.1	12.52
2-2	155	962.170	.13	1.55	69	66	-.64	107	60	135	1.2	11.84
			.13	1.55	69	66		107	60	135	1.2	11.84
2-3	155	69.885	.13	1.55	75	69	-.65	102	61	135	1.2	12.03
			.13	1.55	71	70		101	61	135	1.2	12.01
3-1	155	173.820	.09	1.10	71	70	-.61	89	61	135	1.2	12.28
			.09	1.15	71	71		72	62	135	1.2	12.68
3-2	155	262.320	.13	1.60	72	71	-.68	98	62	135	1.2	12.10
			.12	1.45	71	71		101	61	135	1.2	12.03
3-3	155	366.510	.12	1.45	69	69	-.70	100	60	135	1.2	12.00
			.13	1.55	70	71		99	60	135	1.2	12.06
FINAL		481.835										
S/N		16895913					76	3-5	2-A	2-H		

Nomograph factor: 1271

MAGNITUDE 7 METALS LLC  
METHOD 14 RAW DATA

Line: 2 Start Date: 10/6/21 Run: 1 Filter: 4C

PITOT TUBE

Circle to document  
visual inspection.

SN D 755

Visually inspected? Yes

PROBE TIP

SN 3248

DIAMETER MEASUREMENT (in.)

- |                |             |
|----------------|-------------|
| 1. <u>3260</u> | If previous |
| 2. <u>3208</u> | calibration |
| 3. <u>3270</u> | referenced, |
| 4. <u>3275</u> | circle      |
| 5. <u>3280</u> | Yes         |
| 6. <u>3275</u> | to document |
| 7. <u>3285</u> | visual      |
| 8. <u>3265</u> | inspection. |

Out of round max. 0.004 in.

CAL. BY: SS

CALIPER: MITUTOYO S/N 7002015

NORANDA 0.5"

THICKNESS STD # 1 15000

SAMPLER OPERATION

HEATER BOX SETTING

For Method 13

165 deg. F. +/- 15 deg. F.

Range: 150 - 180 deg. F.

For Method 315

248 deg. F. +/- 25 deg. F.

Range: 223 - 273 deg. F.

PROBE HEAT SETTING

248 deg. F. +/- 25 deg. F.

Range: 223 - 273 deg. F.

BAROMETER READING

29.90 (in. Hg)

CORRECTION FACTOR

-0.14 (in. Hg)

For Method 13 only:

ORIGINAL GASEOUS

FLUORIDE SAMPLE VOLUME 1 (liter)

		INITIAL WEIGHT	FINAL WEIGHT
IMPINGER #	+ 200 ml water	<u>832.1</u>	<u>919.4</u>
IMPINGER #	+ 100 ml water	<u>735.9</u>	<u>805.9</u>
IMPINGER #	+ EMPTY	<u>507.3</u>	<u>518.7</u>
IMPINGER #	+ SILICA GEL	<u><del>1532.2</del> 1529.8</u>	<u><del>1713.3</del> 1709.8</u>
IMPINGER #	+ SILICA GEL		
IMPINGER #	+ SILICA GEL		

BALANCE: METTLER PJ6000 SNR K59603

2 Kg Class S-1 Calibration Wt. 1999.9

WEIGHED BY: SS

Balance check must be +/- 0.5 grams.

COMMENTS: \_\_\_\_\_

Magnitude 7 Metals LLC  
GAS ANALYSIS REPORT

Location PL 2

Date 10/6/21

Run 1

Room C

Analyzed by MK

Run	Time	Percent Carbon Dioxide (CO <sub>2</sub> )	Percent Oxygen (O <sub>2</sub> )
1	10:45	.02	20.9
2	10:50	.02	20.9
3	10:55	.02	20.9

AP

# Potline 2 Roof Exit Velocities and Temperatures

## Manifold (C-66) Averages

WS Temp  
(ft/min) (Deg. F)  
107.1 116.4

## Roof Averages

WS Temp  
(ft/min) (Deg. F)  
86.2 112.7

Date/Time	C-51			C-66			C-82		
	WS (ft/min)	WD (Deg.)	Temp (Deg. F)	WS (ft/min)	WD (Deg.)	Temp (Deg. F)	WS (ft/min)	WD (Deg.)	Temp (Deg. F)
	_WS_AV	_WD_AV	_TEMP_	_WS_AV	_WD_AV	_TEMP_	_WS_AV	_WD_AV	_TEMP_
Averages:	55.4	168.9	111.5	107.1	132.0	116.4	96.1	138.9	110.3
10/6/21 9:05	55.0	170.2	101.9	101.2	134.4	107.2	86.2	130.4	106.2
10/6/21 9:20	50.4	155.0	102.0	115.3	134.6	108.9	90.1	130.0	106.3
10/6/21 9:35	49.6	172.7	102.0	130.2	140.1	109.7	83.9	131.2	106.8
10/6/21 9:50	53.6	152.2	103.0	120.5	140.3	109.5	92.4	133.4	106.7
10/6/21 10:05	46.2	166.1	102.6	122.7	131.1	111.1	84.8	130.8	107.6
10/6/21 10:20	47.4	159.5	102.1	121.1	131.1	111.0	81.8	132.5	108.2
10/6/21 10:35	44.5	174.9	104.3	108.5	132.6	112.9	86.3	134.2	108.7
10/6/21 10:50	61.5	145.2	103.7	118.6	134.3	110.7	86.3	131.1	107.3
10/6/21 11:05	54.1	132.2	103.8	118.8	135.6	110.0	85.3	129.5	106.8
10/6/21 11:20	57.6	134.6	103.3	126.6	138.3	109.5	86.2	134.9	105.5
10/6/21 11:35	57.6	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
10/6/21 11:50	53.2	152.0	104.5	122.4	138.8	109.6	82.9	131.6	106.4
10/6/21 12:05	51.5	148.5	106.7	117.0	135.0	111.2	81.3	131.7	107.6
10/6/21 12:20	54.5	164.8	107.4	118.0	138.9	111.3	80.5	132.6	107.7
10/6/21 12:35	49.0	165.7	105.7	110.6	132.8	112.3	68.3	130.1	109.4
10/6/21 12:50	47.3	153.9	105.8	100.3	134.9	112.4	82.5	130.0	110.6
10/6/21 13:05	54.6	156.4	108.1	92.0	127.5	114.8	87.4	131.6	111.2
10/6/21 13:20	54.7	167.6	108.9	87.7	134.8	114.3	80.0	129.9	110.6
10/6/21 13:35	57.5	167.6	110.0	92.9	128.0	114.5	90.1	132.3	110.6
10/6/21 13:50	76.0	172.4	113.4	98.4	129.8	116.6	97.6	133.3	110.6
10/6/21 14:05	70.2	153.4	116.2	87.9	124.9	118.1	91.5	130.4	110.7
10/6/21 14:20	69.3	173.0	116.2	104.5	128.7	118.9	102.7	133.2	109.5
10/6/21 14:35	55.5	169.3	120.3	116.0	128.9	123.6	93.2	134.2	113.1
10/6/21 14:50	58.6	158.5	118.5	109.1	122.3	121.3	102.2	134.4	114.8
10/6/21 15:05	55.4	161.0	121.0	114.6	128.5	122.4	96.3	134.5	114.9
10/6/21 15:20	80.1	162.5	119.8	105.6	128.4	121.2	94.4	128.4	112.0
10/6/21 15:35	66.7	158.0	117.5	98.1	123.9	119.7	93.1	131.7	114.2
10/6/21 15:50	59.0	168.7	120.8	119.2	127.8	122.6	97.3	137.2	115.3
10/6/21 16:05	59.1	169.0	119.6	122.0	129.6	122.7	96.5	135.1	114.7
10/6/21 16:20	53.3	161.4	118.5	96.3	129.7	120.0	83.6	129.6	114.7
10/6/21 16:35	57.7	184.9	119.2	115.6	129.9	121.4	93.4	134.5	115.6
10/6/21 16:50	49.2	164.1	114.7	103.6	128.4	120.7	94.6	136.1	116.2
10/6/21 17:05	43.3	183.2	114.3	127.4	136.6	120.7	95.8	135.9	115.2
10/6/21 17:20	44.8	184.7	115.8	114.6	134.5	120.7	98.0	137.4	114.2
10/6/21 17:35	45.2	176.9	115.1	120.8	134.9	122.0	100.0	142.0	115.8
10/6/21 17:50	41.9	192.6	115.9	124.6	136.8	121.4	94.2	137.3	114.2
10/6/21 18:05	43.5	195.1	116.0	125.7	139.0	121.5	104.0	137.3	115.0
10/6/21 18:20	48.1	174.9	116.6	135.3	137.4	122.2	109.9	137.3	117.0
10/6/21 18:35	50.7	202.9	117.8	137.7	136.1	122.1	122.8	144.4	117.2
10/6/21 18:50	51.0	179.9	116.5	103.5	125.9	122.1	94.9	135.3	116.2
10/6/21 19:05	51.4	179.9	115.8	114.7	127.3	122.0	93.1	135.4	116.3
10/6/21 19:20	43.4	171.3	114.9	114.0	130.8	122.1	85.8	134.3	115.7
10/6/21 19:35	51.3	162.6	115.0	119.3	130.9	122.2	111.7	156.9	115.7
10/6/21 19:50	52.2	175.8	116.9	111.1	138.7	119.5	122.9	144.0	112.5
10/6/21 20:05	62.6	175.7	113.3	82.2	131.4	114.0	92.6	132.5	109.1
10/6/21 20:20	60.9	168.7	111.8	84.2	132.9	112.8	89.2	131.6	109.7

Date/Time	C-51			C-66			C-82		
	WS (ft/min)	WD (Deg.)	Temp (Deg. F)	WS (ft/min)	WD (Deg.)	Temp (Deg. F)	WS (ft/min)	WD (Deg.)	Temp (Deg. F)
10/6/21 20:35	47.6	161.0	113.7	83.2	135.7	118.6	97.8	137.2	110.6
10/6/21 20:50	53.9	153.6	114.3	103.1	135.5	119.6	98.4	135.7	110.6
10/6/21 21:05	43.4	165.0	114.3	96.8	135.3	119.7	106.9	138.6	111.3
10/6/21 21:20	51.3	168.3	115.1	100.6	137.7	118.0	100.1	138.5	109.5
10/6/21 21:35	44.4	182.1	115.1	102.1	134.9	118.3	114.0	142.9	111.4
10/6/21 21:50	44.4	179.6	115.2	116.1	136.5	118.2	115.7	147.3	111.2
10/6/21 22:05	40.4	196.5	114.5	98.2	137.8	116.8	81.6	130.8	109.5
10/6/21 22:20	46.6	176.5	114.5	108.9	134.0	117.3	109.9	142.1	109.9
10/6/21 22:35	51.0	173.1	114.4	116.5	131.4	119.2	122.5	145.1	112.1
10/6/21 22:50	59.7	169.9	112.8	96.7	129.2	117.7	92.2	136.3	112.3
10/6/21 23:05	64.3	181.1	111.5	92.0	129.3	116.9	91.4	132.0	110.4
10/6/21 23:20	65.6	189.3	111.5	91.9	131.7	116.0	83.8	122.8	110.3
10/6/21 23:35	69.7	188.4	112.0	92.4	132.5	117.0	89.7	124.6	111.3
10/6/21 23:50	67.7	169.4	110.8	100.0	129.6	116.3	88.8	134.0	110.1
10/7/21 0:05	65.6	176.2	110.9	93.6	135.6	116.9	98.8	131.4	111.0
10/7/21 0:20	58.0	178.0	112.8	100.4	139.1	117.8	97.1	131.0	111.4
10/7/21 0:35	63.8	177.8	111.4	93.3	122.7	118.3	89.5	159.2	109.8
10/7/21 0:50	54.1	168.6	110.0	98.0	131.1	118.8	95.0	156.7	109.3
10/7/21 1:05	55.9	181.1	110.8	102.3	127.6	118.7	95.1	133.0	111.4
10/7/21 1:20	53.6	179.3	110.2	96.9	127.9	117.9	80.8	132.8	111.3
10/7/21 1:35	45.9	170.9	107.8	97.0	123.6	116.0	90.4	134.1	110.5
10/7/21 1:50	58.3	174.0	109.2	88.1	123.8	116.8	94.7	129.2	110.5
10/7/21 2:05	60.7	183.7	110.6	103.2	142.0	115.2	91.7	144.3	106.8
10/7/21 2:20	44.2	180.5	108.8	110.0	139.4	114.6	102.9	152.9	107.4
10/7/21 2:35	65.1	177.9	111.9	114.1	133.7	113.5	102.7	142.7	107.3
10/7/21 2:50	61.3	167.2	111.1	109.4	130.8	113.5	92.0	158.7	110.2
10/7/21 3:05	60.9	173.8	111.2	109.5	132.7	114.6	87.6	150.8	110.2
10/7/21 3:20	66.7	172.1	111.4	123.0	139.2	113.5	97.1	164.1	108.3
10/7/21 3:35	57.1	172.4	111.5	103.2	146.9	115.2	104.1	147.2	105.6
10/7/21 3:50	53.4	186.5	112.9	111.2	139.7	117.3	108.6	140.2	108.9
10/7/21 4:05	59.9	181.2	112.7	109.7	138.8	117.8	110.2	157.6	110.2
10/7/21 4:20	50.7	160.2	109.5	93.4	126.3	114.5	104.2	149.8	108.3
10/7/21 4:35	45.8	176.9	107.3	121.5	137.5	112.1	100.6	151.8	109.4
10/7/21 4:50	67.2	150.1	109.7	102.6	129.1	114.6	96.9	152.6	107.1
10/7/21 5:05	63.7	159.6	109.7	96.9	120.7	114.5	110.2	140.5	108.7
10/7/21 5:20	68.5	157.6	110.9	95.6	124.3	116.0	110.9	161.7	109.8
10/7/21 5:35	59.9	151.5	111.0	96.6	124.5	114.8	100.6	162.0	106.9
10/7/21 5:50	70.6	148.0	111.0	99.4	124.7	116.1	105.7	142.7	105.8
10/7/21 6:05	55.1	164.9	110.2	102.5	130.0	114.3	121.8	142.4	105.8
10/7/21 6:20	51.4	170.7	108.3	113.4	130.0	113.7	112.3	142.2	107.4
10/7/21 6:35	60.8	158.5	109.6	121.7	133.9	113.6	107.5	152.8	107.2
10/7/21 6:50	55.8	163.2	109.7	101.7	125.2	113.6	98.8	131.2	105.9
10/7/21 7:05	62.1	160.4	109.3	101.0	127.1	114.6	91.9	140.3	106.5
10/7/21 7:20	47.6	163.7	107.4	98.1	123.0	114.7	99.8	149.4	107.8
10/7/21 7:35	48.4	173.3	106.0	116.2	129.9	112.6	93.3	149.5	108.4
10/7/21 7:50	64.9	153.5	110.5	99.5	123.4	114.7	93.3	136.8	108.5
10/7/21 8:05	53.9	156.0	109.4	103.7	130.6	115.2	93.3	143.3	105.1
10/7/21 8:20	49.0	161.6	108.2	101.5	128.5	114.1	100.1	150.6	107.7